Role of Homework in Mathematics

A study of Teachers’ and Students’ Beliefs in the Role of Homework in Mathematics in a Swedish School

Harjap Singh Mangat
The Role of Homework in Mathematics

A Study of Teachers’ and students’ Beliefs in the Role of Homework in Mathematics in a Swedish School

Harjap Singh Mangat

Abstract

This study investigates some students’ and teachers’ beliefs about the role of homework in mathematics in Sweden. By interviewing eight adolescent students and two experienced mathematics teachers the study discusses the role of homework in relation to learning, teaching, achievements, and relationship between students, teachers and parents. The results suggest that (a) students and teachers have similar beliefs and perspective on homework (b) students and teachers believe in the use of homework to increase mathematics test results (c) homework breeds relationship and communication between students, teachers, and parents (d) the quality and quantity of homework is essential, and that (e) well developed relationship between parents, students, and teachers is essential to create successful students who appreciate homework.

Keywords

Homework, mathematics homework, school homework, mathematics teaching, teaching mathematics students
Contents

Introduction .......................................................................................................................... 4
  Literature Review ............................................................................................................ 5
  Definition of Homework ................................................................................................. 5
  Purpose of Homework ..................................................................................................... 5
  Homework in Swedish Schools ...................................................................................... 5
  Teacher, Student and Parent perspective ...................................................................... 6
Aim of Study ..................................................................................................................... 7
Research Questions ........................................................................................................ 7
Method ............................................................................................................................... 7
  Data collection ................................................................................................................ 8
  Validity, reliability and generalizability ......................................................................... 8
  Research Ethics ............................................................................................................... 8
  Data Transcription .......................................................................................................... 9
Results ................................................................................................................................ 9
  The students’ Beliefs about the Role of Homework ...................................................... 9
    Homework and Learning ............................................................................................... 9
    Homework and Achievements .................................................................................... 10
    Homework and Relations .......................................................................................... 11
  Homework and Life Outside of School ........................................................................ 12
  The Teachers’ Beliefs about the Role of Homework .................................................... 12
    Homework and Teaching ............................................................................................. 12
    Homework and Achievements .................................................................................... 13
    Homework and Relations .......................................................................................... 14
Discussion .......................................................................................................................... 15
  Summary of Results ....................................................................................................... 15
  Homework and Teaching/Learning ............................................................................... 15
  Homework and Achievements .................................................................................... 16
  Homework and Relations .......................................................................................... 16
  Home and Life Outside of School ............................................................................... 17
  Benefits of the Study ..................................................................................................... 17
  Further Research .......................................................................................................... 17
References .......................................................................................................................... 17
Appendix 1 .......................................................................................................................... 19
  Interview Questions for Teachers ............................................................................... 19
Appendix 2 .......................................................................................................................... 20
Introduction

Mathematics is considered to be the one of the most difficult subject in elementary school (Dündar, Guvendir, Kocabiyik & Papatga, 2014). This shows in a research on 789 elementary school students who shared their opinions about various school subjects and weather they are the most likable, most important, or the easiest, and the students pointed out that mathematics is the most difficult (ibid). In addition, a PISA report from 2012 (Skolverket, 2013) demonstrate that the performance of Swedish elementary mathematics students has continuously declined since the mid 90’s until a few year ago.

Now the question arises, even students usually get support from teachers, friends, classes, and libraries, still they cannot properly learn mathematics in school. Then what is the role of homework in mathematics teaching and learning? According to Landers (2013), homework is a matter of debate among families, teachers, and researchers, not the least because the teachers, students and parents have different beliefs about homework (Farkas, Johanson, & Duffett, 1999). Usually the teacher assigns a homework task to the students, but quite often the student does not carry out the task, which cause conflicts at home and at school (ibid).

Again, this issue about homework seems to reflect different beliefs about mathematics among students, teachers, and other adults. Then what are those different beliefs and where do they come from? When it comes to research on this subject, Thompson (1992) suggests that mathematics can be regarded as “a kind of mental activity, a social construction involving conjectures, proofs, and refutations, whose results are subject to revolutionary change and whose validity, therefore, must be judged in relation to a social and cultural setting” (p. 127). Because of that, Thompson stresses the importance to also clarify the term belief. Based on Thompson, Phillips (2007) defines the term beliefs as “psychologically held understandings, premises, or propositions about the world that are thought to be true. Beliefs are more cognitive, are felt less intensely, and are harder to change that attitudes.” /.../ “beliefs, unlike knowledge, may be held with varying degree of conviction and are not consensual (p. 259).

In other words, it seems that beliefs in term of mathematics stem from individuals’ various interests, sociocultural settings and relationship to the word, and the beliefs functions as a lens for e.g. interpreting pros and cons of homework. For example, Westlund (2013) points out that attitudes towards homework in USA and Sweden have gone through many up and down stages, and politicians like ex-president Ronald Reagan and Swedish Prime Minister Göran Persson consider homework a way to increase the level of education, competence, and prosperity of the country, while others are of another opinion. Svensén (2013) questions Göran Persson suggestions and presents various problems from the perspective of students, parents and teachers regarding homework. From the students’ viewpoint, homework can be regarded as a boring and time-consuming overtime work. From the teachers’ viewpoint, giving homework to students that disobey or are getting behind the schedule sometimes is a simple but inaccurate solution. In addition, homework is not mentioned in Swedish curriculum, and it can be questioned if homework gives equal opportunities to the students, since some students get more support from their parents and peers at home. Besides, in an interview with Susanna Walter-headmaster at Västra skolan in Falun – Susanna declares that her elementary school no longer assign homework to their students, yet the students get average or above average results in comparison to other schools in Sweden (Svensén, 2013).

This shows that people’s beliefs in homework in mathematics varies according to political viewpoints, socioeconomic background, education, experience, support or pressure from parents, and many other
factors mentioned above. This motivates an examination of students’ and teachers’ belief about the role of homework in mathematics.

**Literature Review**

**Definition of Homework**

Cooper (2007, p.4) defines homework as “task assigned by school teachers that are intended to be carried out during non-school hours.” Kaur (2011, p.187) adds that “homework provides an opportunity for students to extend and consolidate what they have learnt in school and for teachers to extend the time for learning beyond the school of formal education”.

On the other hand, a Swedish curriculum (Lgr 80) points out that homework can actually be carried out in schools: “Om elever av särskilda skäl inte kan utföra en given uppgift i hemmet, bör det ingå i en naturlig del i skolans planering att I olika former hjälpa dem att fullgöra uppgifterna i skolan” [If, for special reasons students cannot perform a given task at home, it should be an integrated part of the school’s routines to help students fulfil the task in school in various ways.]. (Lgr 80 p. 52)

In other words, homework is an extension of the ordinary education, but does not necessarily have to be carried out at home since it can also be completed during school hours.

**Purpose of Homework**

A purpose of assigning homework is to encourage parents to be interested in the child’s school work (Hellsten, 1997). Another purpose is to give students the opportunity to catch up with the rest of the class (Epstein & Voorhris, 2001) or to consolidate what students have learnt and prepare them for upcoming tests and examinations (Kaur, 2011). In addition, Cooper (2007) points out that two main purposes of homework: the instructional and non-instructional. Instructional purpose provide subject-related directions or instructions on how the student can be successful within the formal field of study, while non-instructional purposes apply to the informal aspects of education, for example parent-child communication and community relations. Finally, the key purpose is often to improve achievements in school, and Cooper (2007) claims that students doing homework do better that students who do not, pointing that out of 12 homework-related studies, 11 demonstrate a positive correlation between homework, high grades, and high scores in standardized tests (ibid.).

**Homework in Swedish Schools**

Strandberg (2013) illuminates that homework existed in Sweden before elementary school were established. Although, homework is not even mentioned in the present Swedish national curriculum for the compulsory school (Lgr 2011), nor mentioned in the previous curriculum (LpO 94). On the other hand, some earlier curriculum (Lgr 80; Lgr 69) regulate homework. Lgr 69 states that it is the responsibility of the school weather home assignments should be completed at individual level or at group level. Lgr 80 regulates that home assignments should be completed at individual level only, and that they should be designed according to individual skill. If students for special reasons cannot finish assignments it is the school’s responsibility to support the student, including teachers’ responsibility to support students who cannot finish the home assignments at home. Furthermore, the curriculum states that home assignments should provide opportunity for the student to revise or practice the content to improve their knowledge and skills.
PISA 2012 (Skolverket, 2013) shows that the average time spent on homework in Sweden is about 200 minutes per week, while for Singapore the time spent is about 550 minutes per week. The 2011 TIMMS report (Mullis, 2012) demonstrates that Swedish students in class 8 spent less time on homework as compared to other international students. Also, the report clarifies that about 40 percent of the students mention that they got homework in mathematics only once in week. Around 25 percent mention that they spent about 45 minutes on mathematics homework per week, which is almost the same amount as countries like Japan, Finland and Korea which are countries on top position in the TIMMS report.

Some factors affect the utility of homework in Sweden and other countries, and one factor is classroom follow-up (Cooper, 2007). This factor represents how teachers deal with homework when the students have returned their home assignments. Further, Cooper points out that teachers, offer various form of feedback, like written comments or grades, and that teachers can provide rewards for completing homework with accuracy, or can test the homework content and/or using the homework as starting points for classroom discussions (ibid.).

**Teacher, Student and Parent perspective**

In a survey, Farkas, Johnson and Duffett (1999) found that over half of the teachers mentioned that they have classroom problems from those students who fail to do their homework. In addition, a majority of teachers want the parents to get involved with their children’s homework. Although, just a few teachers believe that the parents actually do this. A large majority of teachers think that the parents just ask the children if they have done their homework or simply leave the students to complete their homework themselves. The survey also shows that homework can cause conflicts between parents and children, and about half of the parents describe how they have had serious arguments with their child about homework. Some parents have even finished parts of their children’s homework, for example when the children were too tired or unable to fully understand the homework (Farkas, et al., 1999). This finding is partially confirmed by Landers (2013) who describes how both parents and teachers are frustrated when student do not do the homework or when they fail to complete homework to their teacher’s satisfaction. In another study Kaur (2011) describes a teacher’s perspective on assigning homework to students to increase their results in tests and examinations. In addition, two teachers assign homework to make their students take over more responsibility for their education.

On the other hand, teachers and parents sometimes have negatives viewpoints on homework. Coutts (2004) points out that some teachers assign homework to get social respect, since they are judged by how much amount of homework they assign to their students. Through a parent who is also a teacher Coutts also present a parent-teacher perspective, which yields exclusively negative opinions on homework, both from a teacher as well as a parent perspective. Additionally, Coutts shows that parents who were not teachers, on the other hands believed in the positive effects of homework, and they tended to judge teachers based on how much homework they assigned to their students. A student perspective in Singapore is presented by Kaur (2011), who demonstrates that the selected students have a positive outlook on homework. Almost all students indicate that homework provided by mathematics teacher improve their learning in mathematics. In this setting, homework is described to have six functions, namely to (a) improve the understanding of mathematics concepts (b) revise or practise the topic taught (c) improve problem solving skills (d) prepare for tests (e) learn from mistakes, and (f) extend mathematical knowledge (ibid.).

In contrast to the Singapore-based study above, Österlind (2001) describes that Swedish students’, teachers’ and parents’ perspective on homework, and finds that several students believe that homework exists as a result of tradition, while the other students assume that homework is a way for teachers to
create order, discipline, and progress. Other perspectives are reported by Warton (2001) where grade 2 children describe homework as an opportunity “to learn” whereas grade 6 students describe it as a way “to revise” previous material. In addition, he points out the difference between teachers’ and students’ view on the purpose of homework and shows that the student’s answers do not reflect the teachers’ beliefs that homework contributes to learning responsibility and improved time management or study skills. Westlund (2007) confirms Warton’s findings by illustrating the clear difference between Swedish teacher’s and student’s beliefs in the effects of homework. For example, the teachers express a belief that homework improves the connection between home and school, while students express a belief that homework is a way for parents to control their children’s school work. In addition, the teachers describe how homework can increase the students’ interest for school, while the students on the contrary describe that homework does not add to their interest in school work at all.

Aim of Study

From the literature review above, it is very clear that students’ beliefs about homework is very different from teachers’ and this needs further research to be understood more in-depth. Therefore, the aim of this study is to examine teachers’ and school students’ beliefs about key aspects of homework in mathematics. Such a study might expand our knowledge of teachers’ and students’ contrasting perspectives on homework in mathematics.

Research Questions

This study will seek to answer the following two research questions:

1. What beliefs about the role of homework in mathematics do some experienced high school teachers express?

2. What beliefs about the role of homework in mathematics do some adolescent school students express?

Method

This section illuminates which method is used for data collections, source of data collection, method of data analysis, validity and reliability and ethical considerations.
Data collection

A qualitative method was used to collect data and analyse data. Johansson and Svedner (2010) point out two types of qualitative interviews: structured and semi-structured interviews. The interview questions of this study are semi-structured as I utilised a semi-structured qualitative interview method for data collection. These semi-structured qualitative interviews are based on interview questions that are not fixed, but the basic structure or theme of each question is fixed (ibid.). This gives room for follow-up questions to make sure that the interviewee really answered the questions that tie in with the theme of this study. Questions or follow-up questions thus varied from interview to interview depending on the interviewee responses.

In this way, data was collected from an international school in Stockholm. Two teachers and six students from 8th grade agreed to participate in the interview. After recording and transcribing the interviews I altered the names of all teachers and students to protect their integrity. The two teachers were named Kevin and Andrew. Both have been working with this school for several years. Kevin is a certified teacher from Sweden with experience of 17 years of teaching mathematics and science in a Swedish school. Andrew is also a certified teacher in Sweden with an experience of 4 years of teaching mathematics and science in various schools. I asked 8-10 students to participate and six of them agreed to participate. The students were selected without me knowing their background. Out of these six students four of them (named Pele, Olof, John, and Peter) are male, and the remaining two students (named Lisa and Jennie) are female. All the interviews were recorded by using smartphone and the total time for recording all interviews was 86 minutes, which includes interviews of all six students and two teachers. All interviews were recorded in school.

Validity, reliability and generalizability

Validity reflects whether the chosen method really investigates what it is intended to investigate (Kvale & Brinkman, 2009). To increase the validity of the study, I was careful to formulate the interview questions so that they really capture and match the aim of the study and the research questions. Reliability indicates whether the study yields the same results if repeated on other occasions and by other researchers (ibid.). By being careful, methodical and consistent in the transcription process, the essay’s reliability can thus increase. Regarding the generalizability of the study, it can be said that the limited number of interviewees means that the result could not be considered as generalizable in general, but possibly transferable to other specific research with the same selection, method and results (Bryman, 2011).

Research Ethics

Johansson and Svedner (2010) discuss research ethics, and based on Vetenskapsrådet (2002) ethical guidelines they point out four key areas to protect the integrity of the research participants, namely that (1) all participants shall be fully informed about research (2) all participants are free to participate or not participate in research (3) data collected from all the participants shall be handled in confidence and be protected from public scrutiny, and (4) data collected from participants shall be used for research purpose only.

To abide to these ethical guidelines, I sent letters of permission to the teachers (appendix 3) and to the student’s parents (appendix 4) to have them signed before interviewing the informants. In the letters of permission, all respondents were informed about the purpose of the research, and participation was
voluntary. Letters of permission from interested participants were received within one week. To handle data confidently, I have never mentioned exact location of the school from where data was collected.

**Data Transcription**

The interviews were listened to and transcribed one by one. I used an inductive thematic analysis approach for data analysis. I used such an approach, since thematic analysis is a widely used qualitative research analysis technique which can provide a rich and detailed account of data (Braun & Clarke, 2006). Besides, it is a flexible and relatively easy method to learn and carry out, which makes it possible for researchers with limited experience of qualitative research to highlight similarities and differences across a data set (ibid.). From the interview transcriptions I thus highlighted data relating to the two research questions. In this process I ended up highlighting and categorizing the transcribed material into the themes showing in table 1 below.

<table>
<thead>
<tr>
<th>Students beliefs about homework in mathematics</th>
<th>Teachers belief about homework in mathematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework and Learning</td>
<td>Homework and teaching</td>
</tr>
<tr>
<td>Homework and relations</td>
<td>Homework and relations</td>
</tr>
<tr>
<td>Homework and achievements</td>
<td>Homework and achievements</td>
</tr>
<tr>
<td>Homework and life outside of school</td>
<td></td>
</tr>
</tbody>
</table>

*Table 1: Interview transcriptions themes for data analysis.*

The analysis below is based on these themes.

**Results**

**The students’ Beliefs about the Role of Homework**

**Homework and Learning**

The interviewed students described that homework plays a significant role for their learning of mathematics. Particularly, the students saw homework as a strategy for better learning, for example when they get homework and find additional information on a topic. They described that this help them to learn new things which later can be discussed in group or class work. The students also expressed that they learn more when they discuss their homework with other students. This was for example described by both Pele and Olof when they answered a question about what they learn from homework.

Pele: /…/ it’s[homework] actually a good, because you learn a lot of new things and then when you go to class you can discuss. You usually have a discussion about them and you even learn more depending on what other people found online.

Olof: /…/ It’s a way of encouraging or making students review and work at home. So, you can learn more in depth when you have done.
From these two examples it is apparent that the students expressed a belief that homework is helpful for learning mathematics. If they must discuss some topic, they learn more about that topic through homework, which expands their mathematical knowledge. Also, they pointed out that homework encourages them to learn more about various subjects at home, which adds more depth to their mathematical knowledge.

Another belief interpreted from the students’ answer was that homework plays a significant role in revising classwork and keeping them up to date with their classwork, when they cannot learn everything during the lessons. So, by doing homework they can catch themselves up with class teacher and rest of the class. This improves their learning in mathematics.

Jennie: I think it is mostly just repetition of what we’ve learnt in class, but I find it necessary, if you not had time to … or if you have not really paid enough attention in class, that is way to get knowledge from that lesson. Especially if you’ve been sick, you can do the homework.

Peter: /…/ we get homework, because then we don’t … only get to study in school. Then we can repeat it in our heads, so we learn more about it.

From the example above the students described how they use homework to revise the work they have done in the school. So, the interpreted belief of the students is that homework in mathematics is a way to repeat and practice what they have learned in school. They clearly described how repetition of classwork at home help them to learn mathematics.

Another interpreted belief is that homework can teach students an important life skill called ‘responsibility’. The students described that they are quite responsible for learning in their own time and submitting the homework at a given time in school.

Jennie: well, usually there are several questions that I am to answer at home, then just bring it back to school the due date.

Olof: I think it’s because they want us to learn on our own time, so we don’t just go home and forget it.

From the two examples above, the students’ belief seemed to be that homework can teach them responsibility. Students learn responsibility when they must respect dead-line, and know that they must submit their homework at a given time. Also, they know they must learn their subject in their own time.

Summing up, the students expressed a belief that one role of homework is to help them learn more about the subject and about life. Regarding mathematics they expressed how they both widen and deepen their knowledge of mathematics. They also expressed how they learn life skills like responsibility through mathematics homework.

**Homework and Achievements**

The students described that homework plays a vital role for their grades. More specifically, they explained that homework is a way to give them a deeper understanding about the subjects and a way to understand the subject from several perspectives, so they can achieve better grades. They described this particularly when asked about the purpose of homework in mathematics.

Pele: I think it’s to gain a better understanding of what you’re doing on class and also help you remember, and to find out more deeply what the subject means and like what you have to do with it and how to get better grades.
Peter: I can learn different ways to give answer and yeah, it’s like practicing more on the things we do in school, so you can get better grades on the tests.

From the above two examples it is apparent that the students’ regarded homework as a mean to get better grades and from this I infer a belief that homework is significant for their achievements. Through homework the students can revise their work at home, learn more so they can perform better on tests and get better grades.

**Homework and Relations**

The students described that homework plays a role for the relations between school and home. Through the homework, parents can track what is happening in the class. If the students cannot complete their homework on their own, they ask their parents for help first. If parents cannot help, then they ask the teachers. Here are some examples, when students are asked for if they need help in completing homework.

Olof: /…/ if its math for example, then you might need help for solving a problem, you don’t know what’s wrong, then you can ask your parents or maybe you have sibling. But if you don’t understand that, then you can ask your teacher.

Lisa: I usually ask my parents first, because they are the closest, but I will also ask the teacher if there is some concept that I don’t understand or that I need clarification of.

From these examples it is apparent that the students expressed a belief that homework plays a vital role for maintaining relationship between school and home. Whenever students need help in completing homework they approach their parents first. If parents are unable to help, then students ask their teachers to help.

All the students agreed that their parents encourage them to do homework, which has an impact on the students’ relationships at home. In the following extract the students explain that homework affects the relationship with their parents in the sense that the parents like the homework system and encourages the students to do the homework. Below are few examples, when students are asked about what their parents think about their homework in mathematics.

Pele: I think they … well I probably think that they think it’s quite a good thing because it makes you think about the project and stuff you’re doing in school or outside, school /…/ So I think, they think it’s quite a good thing actually.

Jennie: My parents encourages me to do all my homework and they think it is a good idea and they like our homework system.

John: I think they like it because they are a bit old-fashioned, they have grown up with homework.

From the examples above it becomes clear that the students feel that their parents have a positive outlook on homework and thus encourage them to do homework. In this way, homework plays a significant role in the relationship at home.

To sum up, the students shared the beliefs that homework plays a vital role for maintaining relationship between school and home. They also expressed that homework is significant for the students’ relations with parents at home, which urges them to finish the homework.
Homework and Life Outside of School

The students described that homework also plays a role in their life outside school. When they must carry out difficult and time-consuming homework, they become stressed. The students also explained that homework influences the way they plan their free time. Here are some examples from when the students asked questions about homework and life outside school.

Lisa: Yeah, I have to plan my free time around what the teachers assign me to do at home. Usually it’s pretty easy thing but still I have to do them. And it takes time that I could do other things instead.

Olof: /…/ yeah it effects my free time, because then I have to take time to sit down and do it, so it depends how much

Jennie: well, of course it does, because it is quite time consuming. But I don’t think it affects negatively, other than fact that I am not able to spend that time with my friends but I think it is valuable for my educational experience to have homework.

From the above example it becomes clear that the students felt that homework limits their life outside of school. Particularly, homework consumes part of their free time, which compels them to spend less time with friends. In addition, they must plan their leisure according to the quantity of homework assigned. In that way, homework limits the students’ life outside of school.

The Teachers’ Beliefs about the Role of Homework

Homework and Teaching

The teachers expressed the beliefs that homework has a positive impact on their teaching, primarily because the homework was seen as a useful tool to make sure that the students understand and comply with what they have been teaching and additionally because the teachers’ homework assignments helps the students to keep up with the teaching. Below is an example of when a teacher replied questions about homework and impact homework has on his teaching.

Kevin: Because it helps the teacher to make sure that students understand everything during lesson. homework always has a positive effect. Because some students did not understand everything in school. May be parents can help and they understand better at home like it’s a peaceful at home. I mean a study environment.

From the above, it is suggested that the teachers’ belief that homework always has a positive role in teaching, because some students do not understand everything in school, and because it gives some of the students the opportunity to learn in a more peaceful home environment, whereas classrooms can sometimes be a learning environment with too many distractions. Additionally, it is suggested that the teachers believe that some students learn more easily directly from teacher, while some other students would prefer to learn through their parents, and homework gives the students some degree of choice between the two.

Some teachers expressed that homework plays a role in teaching life skills like responsibility, time management and punctuality. They shared the opinion that teaching life skills to students is of key importance, along with teaching mathematics. Below is a couple of examples of when teachers are being asked about the purpose of assigning homework to students.
Andrew: I believe it’s important to teach them responsibility outside of their job place, for the future. So, for instance I wish my job was nine to five but it’s not. So, I have to take work home and on the weekends and get catch up. The students should learn a similar approach that. You know, I don’t finish it in given time, I still need to do it no matter what.

Kevin: May be just to like if you know if they, if they hand in or do homework in time just they learn how to respect the dead line and stuff. /…/ that's thing they learn you have to hand work in time /…/ be punctual, be disciplined and respect the deadlines.

From the above two examples it is apparent that the teachers’ belief that homework is not only about teaching mathematics but also about developing life skills like responsibility, discipline, and time management. Thus, from the perspectives of the teachers, homework is an important aspect in the students’ lives generally for example when the students must submit assignments within specific deadlines.

To conclude, the teacher shared the belief that homework facilitates the students’ learning by giving them the opportunity to learn both at school and at home, and by giving them the chance to learn life skills like responsibility, discipline, and meeting deadlines.

**Homework and Achievements**

The teachers described how homework increase student achievements and grades, especially when students need to catch up with rest of the class, i.e. they catch up at home and that way perform better during tests and get higher grades. The comments below give a few examples of this, where the teacher answered questions about how homework adds to students’ tests and grades.

Kevin: To complete the work which is not done in classroom. It can be to learn for the test, like to revise things.

Andrew: /…/ Sometimes they got mathematics problems for the preparations of coming tests. That’s what I feel homework is.

Here the teachers describe the belief that homework help the students to complete work which was not finished in the classroom, and how this prepare the students to perform better in tests and get better grades. They also expressed that the students get the opportunity to revise their work, which increase their chances to be successful in tests and achieve more.

Below, a couples of teachers expressed a belief that some of the reasons for the Swedish students’ low performance in PISA tests depends on the fact that different countries have different curriculum and expectations on their students, even though the students have the same age. They also expressed that the quality of homework has an impact on the students’ learning which in turn shows in the PISA results. For example

Andrew: I’m teaching grade eight and nine now. Well, in Canada, that would be grade nine and ten.

Kevin: May be in Sweden is not doing well, then which means we just doing homework for homework’s sake, there is no quality here. The Swedish students are not learning anything from it. And other countries are gaining from it because their homework has a better quality.
In other words, the teacher expressed that achievements are measured on unequal terms in international tests, and this context the teachers conveyed that homework can increase the students’ achievements through homework, but added that homework assignment in Sweden are of low quality.

As a conclusion, the teachers expressed the belief that homework gives the students the opportunity to catch up when lacking behind and to revise their work in order to achieve more. The teachers also conveyed that the quality of the homework is too low in Sweden.

**Homework an Relations**

The teachers described how homework affects the relations between teachers, students and parents in positive and negative ways. Positive in the sense that parents can see what is going on in the school, and that parents can help the students. Negative in the sense that parents often expect the teacher to assign homework even though the homework is not always necessary, and in the sense that some students get too little support, while other students have too demanding parents. Homework was also described to play a role in student-teacher relations, in the sense that students can establish direct communication with the teacher through the homework. The teachers described the answering questions about parents influence in students’ homework below.

Kevin: It is good for parents to see what we are doing in school, and that they can support their children with the homework. /…/ but sometimes they expect me to constantly present homework even though it is not necessary, and they start to ask question about it.

Kevin: Parents do encourage homework. The only thing they want, it should be very clear and understandable, and then parents can help, but some of them put a lot of pressure on their children.

Andrew: Once again my subject[mathematics] dictates quite a bit of my interactions with parents and students. Like, sometimes I get more direct communication with some students through homework. /…/ but not everybody gets homework support by their parents.

From the examples above the teachers suggested that homework affects relations between teachers, parents and students, e.g. parents get a picture of what is going in school by scrutinizing the homework of their children, and get a connection with the teacher by sharing their opinions about homework. Additionally, Parents can help students to do their homework and that way establish a connection between parent and student. Also, the student can sometimes establish a communication to the teacher via the homework.

On the other hand, the teachers describe that homework can deteriorate the relations between students and their parents, especially if the parents put too much pressure on their children, or if they cannot help their children when doing the homework. This was described by both Andrew and Kevin in the following excerpts.

Andrew: Math scares a lot of peoples. /…/ when I have parents trying to help students, sometimes they confuse their students a lot more, because they truly don’t understand it themselves.

Kevin: So, it can even spoil their relationship between parents and their children as well bco’z parents want their child to do homework and they don’t want to listen their parents.
From these two examples it is apparent that homework in mathematics can have both a positive and negative impact on the relations between parents and students. Sometimes parents and students are unable to understand the mathematics homework, as result the parents might try to help, but accidentally make their children more confused. In addition, sometimes parents want their child to do homework on their own, who might be unable or unwilling to do it, which may result in conflict.

Summing up, the teacher expressed both positive and negative beliefs about how homework affects relations. One inferred belief was that homework enhance the relationship between parents and school as well as between parents and students, and another inferred belief was that homework can create conflicts about school work between parents and students.

Discussion

Summary of Results

To answer the two research questions (1) What belief about the role of homework in mathematics do some experienced high school teacher express, and (2) what belief about the role of the homework in mathematics do some adolescent school students express, I carried out qualitative interviews and identified number of themes that discuss and answer these two research questions.

One of the theme expresses the students’ and teachers’ belief about the connection between Homework and learning/teaching. With respect to the interviews, it is clear that the students express a belief that homework can help them widen and deepen their knowledge of mathematics and also learn more general life skills like responsibility and meeting deadlines. Similarly, the teachers expressed that homework facilitates the students learning by giving them the opportunity to learn in both at school and at home, and by giving them the chance to learn life skills like responsibility, discipline and meeting deadlines.

Another theme expresses the beliefs about homework and achievements, and both the interviewed students and teachers conveyed homework as an opportunity to perform better on tests and get better grades.

A third theme expresses the beliefs about homework and relations between students, teachers, and parents. The interviewed students conveyed that homework is particularly significant in relation to their parents, who usually urge them to finish the homework. The teachers suggested that homework enhance the relations between parents and school as well as between parents and students, but also suggested that homework can create conflicts about school work between parents and students.

Additionally, the students felt that homework consumes their free time, compels them to spend less time with friends, and limits the students’ life outside of school.

In sum, the results suggest that students and teachers share similar belief regarding homework in mathematics. Below, each theme will be discussed more in depth, and will be compared to other research findings.

Homework and Teaching/Learning

The present study shows how the students expressed a belief that homework improves their learning of mathematics. They, for example, describe that they received additional information through homework,
which helped them to develop knowledge of mathematics. Kaur (2011) also showed similar beliefs, that homework improves understanding of mathematics concepts. On the other hand, Österlind (2001) described a student-belief that homework was assigned by teacher for punishment or discipline. This belief was, however not expressed in the present study. Therefore, students in this study expressed mostly positive beliefs about homework for their learning in mathematics. Students expressed that homework helped them to revise their class work and repetition of classwork at home help them to learn mathematics. A similar belief was mentioned also by Kaur (2011), where a majority of students expressed that homework provided by mathematics teacher improves their learning in mathematics, particularly by improving their understanding of mathematics concepts, revising or practicing the topic taught, improving problems solving skills, preparing for tests, learning from mistakes, and extending mathematical knowledge. The teachers in the present study expressed a belief that homework helped them teach both mathematics, responsibility, and time managements to their students. In contrast, Farkas, Johanson and Duffett (1999) described that how teachers suggested that homework could mean problems for the classroom work. The teachers in the present study did not express any such belief about homework contributing to any type of classroom problems. The difference could be because of the amount of work assigned in USA is different from the amount of homework in Sweden. Even TIMMS (Skolverket, 2012) showed that Swedish schools spent less time on homework compared to other countries.

Homework and Achievements

This study demonstrated that students and teachers believe that homework significantly increase students’ achievements in term of performing better in tests and obtaining higher grades. This is confirmed by Cooper (2007), who showed that 11 out of 12 related studies indicate a positive relationship between homework and grades. Also, Kaur (2011) demonstrated that homework can be used for preparation of tests and examinations to increase grades. This might be true especially in the field of mathematics, since the teachers in this study believed that mathematics is harder subject for many students. This is also confirmed by Dündar, Guvendir, Kocabiyik, and Papatga (2014) that mathematics is most difficult subject for elementary schools. In contrast, the test results of Swedish students in international reports like PISA and TIMMS has been meagre during the last two decades, in comparison to other countries. The teachers in this study believed that this is due to a lower homework quality and different curriculums in Sweden, weather better performing countries have higher homework quality.

Homework and Relations

In this study, students and teachers shared similar beliefs on relationship-building through homework. Both students, and teachers replied that homework builds or improves relations between students, parents and teachers. In this context, students mentioned that the parents encourage them to do homework, partially to give the parents an idea of what is going in class, and partially be given an opportunity to support their child. This finding goes in line with Westlund’s (2007) observation that parents see ‘homework as opportunity’, where parents get the opportunity to know what is going on in school and help their child in meeting the higher expectations. Westlund’s observations is very similar to Hellsten (1997) who in her study showed that teachers assign homework to encourage parents to care and create interest for their child’s school work. Adding to these two studies, this essay shows that not only were parents ready to support their child, but all students mentioned that also siblings help them to complete their homework, and if parents or siblings are unable they could get support from the teacher. Based upon study in USA, Farkas, Johanson and Duffett (1999) adds that this support that students get either from
home or from school improves the students’ learning and decrease the classroom problems and conflicts between school and home, due to an increased communication and mutual understanding. Although, in this study the teachers believed that if parents are unable to help their children, homework can breed negative relationship between parents and their children. Although, in this study there was no sign of conflicts between students, teachers, and parents.

**Home and Life Outside of School**

Significant for this study is the similar beliefs among students and teachers, where both students and teachers see homework as an opportunity and less as burden. Albeit students understand that homework means extra work that takes time and restricts their lifetime outside school, the students still prefer to do homework. This was apparent when students and teachers answered question about eliminating homework and almost all said homework is necessary. A reason for this pro-homework attitude could be found in the participating students’ background and ambitions in an international school with high carries expectations. In stark contrast to this study, Westlund (2007) demonstrate a clear difference between adult’s and student’s viewpoints about homework, where the adults see the importance and students see the burden of homework and the way it decreases their leisure time.

**Benefits of the Study**

By sharing and discussing teachers’ and students’ beliefs about the role of homework in mathematics, this study may to some degree have clarified and discussed this role in connection to teaching, learning, achievement, and relationship between students, teachers and parents. Since the literature review section of this essay shows that there is a lack of studied in this field of research that particularly investigates students’ perspectives on homework, this essay could add a little to this field of research. In addition, it might be of value for teachers and particularly for mathematics teacher to get a more complete understanding of students’ viewpoint on homework in mathematics through this essay, and by the same token to get insight into the dynamics between homework and the relationship between students, teachers, and parents.

**Further Research**

Since this study indicates that the students took a positive stance on homework, while several other studies on the contrary emphasized the students’ unwilling attitudes to homework, it could be of value to further investigate why the students arrive at such different beliefs, and to find out whether these differences are based upon discrepancies in research method, selection, or on other factors.

**References**


Appendix 1

Interview Questions for Teachers

1. How long you are working as a teacher?
2. Do you used to give homework to your students?
3. How often do you assign homework?
4. How will u define homework?
5. What is purpose of assigning homework to students?
6. What do you think before assigning homework to students?
7. Do you used to assign same homework for whole class?
8. What is main source of homework assignments for you? From where do you choose home assignments?
9. Do your school has some homework policy? What is that?
10. What do you think how much it takes for every student to finish homework?
11. Almost how many students’ complete homework?
12. How do you used to check homework?
13. What do you think about parent’s view towards homework?
14. What do you think, what are the students view about homework?
15. Do you think homework makes a different in Swedish schools?
16. What the students learn from homework?
17. What are your suggestions for improving homework system in schools?
Appendix 2

Interview Questions for Students

1. Do you used to get homework to your teachers?
2. How often you used to get homework in mathematics?
3. What is homework?
4. Why do you get homework?
5. What do you think what are about purposes of homework?
6. Do your school has some homework policy?
7. What do you think how much it takes for you to finish homework?
8. Do u feel you need help in completing homework?
9. What happens if you cannot complete your homework?
10. How does your mathematics teacher used to check the homework?
11. What do you think about your parent’s view towards homework in mathematics?
12. Do you think homework makes a different in Swedish Schools?
13. Do you think homework in mathematics is different from other subjects? Why?
14. What do you learn from homework?
15. What are your suggestions for improving homework in school world?

Appendix 3

Letter of permission from Teachers who will participate in an interview in school

Hello,

My name is Harjap Singh Mangat and I am studying at Stockholm University to become a teacher in Sweden. As a part of my teacher education, I have to write an essay, so I need to interview a couple of math/science teachers for my essay, so I request you to participate.

The theme of my essay is role of homework in mathematics in a Swedish school. My aim is to collect students’ and teachers’ beliefs about homework through qualitative interviews. All interviews will be recorded. All the material will be handled confidentially. All recording will be deleted after study is accepted. The participants name will not be mentioned in the study. Not any single participants will be possible to identify in the essay. All the participants are free to participate and can cancel their participation before or during interview even if they have signed permission letter.
I hope that you will participate in my study. If you have any questions, please do not hesitate to contact me. My mobile number is 0739356875 and email is hp.mangat@live.se. You can also contact my supervisor Prof Anna Pansell on anna.pansell@mnd.su.se at Stockholm University.

I have read the above information and agree to participate in this study conducted by Harjap Singh Mangat

Yes ☐ No ☐

______________
Date

______________  ______________
Full Name     Signature

Appendix 4

Letter of permission from parents whose child will participate in an interview in school X

Hello,

My name is Harjap Singh Mangat and I am studying at Stockholm University to become a teacher in Sweden. As a part of my teacher education, I have to write an essay, so I need to interview a couple of students. So, I request you as a parent to allow your child to participate in my essay.

The theme of my essay is role of homework in mathematics in a Swedish school. My aim is to collect students’ and teachers’ beliefs about homework through qualitative interviews. All interviews will be recorded. All the material will be handled confidentially. All recording will be deleted after study is accepted. The participants name will not be mentioned in the study. Not any single participants will be possible to identify in the essay. All the participants are free to participate and can cancel their participation before or during interview even if they have signed permission letter.

I hope that you will allow your child to participate in my study. If you have any questions, please do not hesitate to contact me. My mobile number is 0739356875 and email is hp.mangat@live.se. You can also contact my supervisor Prof Anna Pansell on anna.pansell@mnd.su.se at Stockholm University.

Yes ☐ No ☐
______________________________  ________________________________
Child’s Name                                                                 Signature

______________________________
Date

______________________________
Full Name